15¢
$5.50 A YEAR

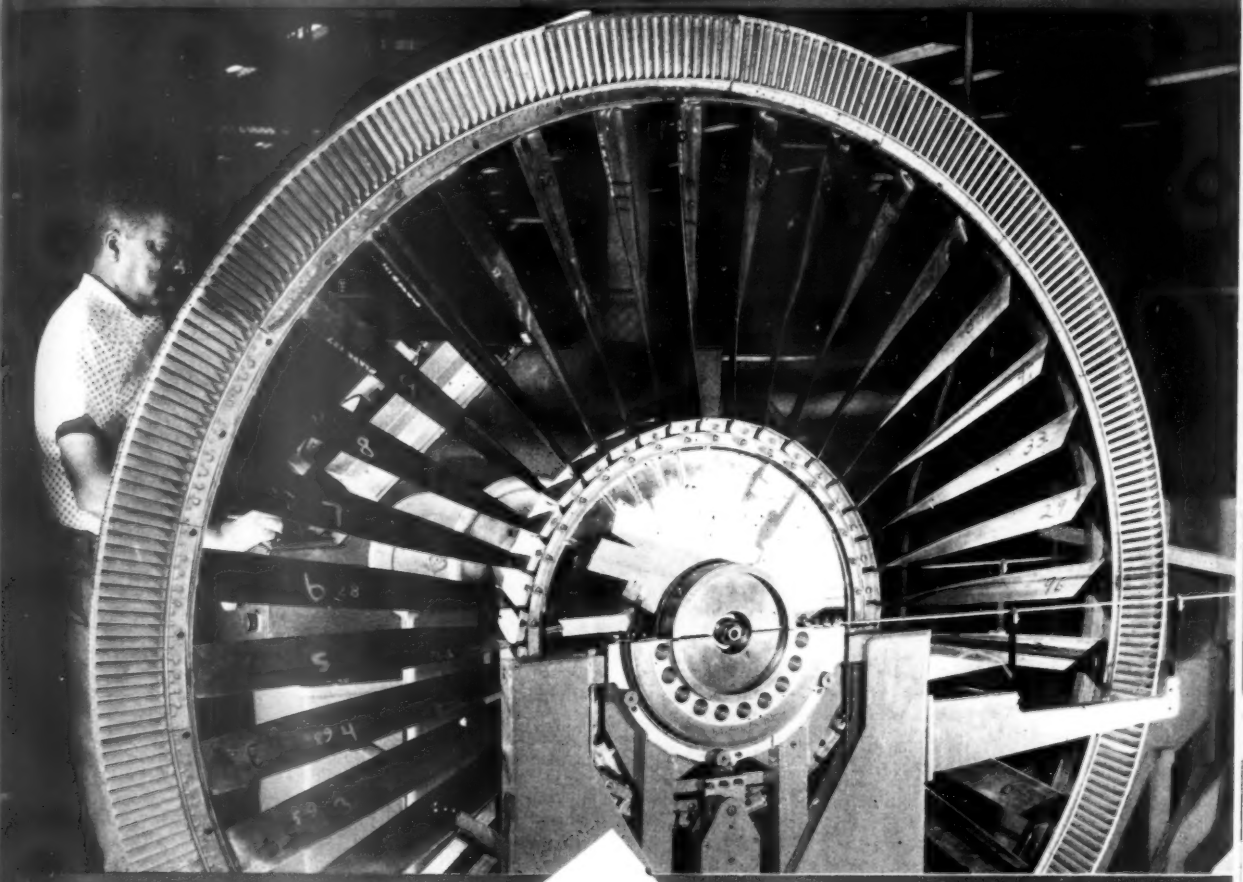
August 20, 1960

VOL. 78, NO. 8 PAGES 113-128

SCIENCE NEWS LETTER

RECEIVED
AUG 20 1960
MIAMI UNIVERSITY

THE WEEKLY SUMMARY OF CURRENT SCIENCE



VTOL Lift Fan Rotor

See Page 120

MIAMI UNIV. LIBRARY
PERIODICAL RECORD
OXFORD OHIO

A SCIENCE SERVICE PUBLICATION

GENERAL SCIENCE

Advisers to Candidates

➤ BOTH PRESIDENTIAL CANDIDATES are independently seeking and getting expert advice from leading scientists on nuclear testing, defense, space, and health and medical care.

Sen. John F. Kennedy has chosen Dr. Jerome B. Wiesner, a member of President Eisenhower's Science Advisory Committee, as his top adviser on nuclear disarmament and test suspension. Dr. Wiesner, currently director of Research Laboratory Electronics at the Massachusetts Institute of Technology, has worked extensively in radiation research.

A spokesman for Sen. Kennedy said that the Senator did not consider his selection of Dr. Wiesner unusual.

"The Senator believes," said Pierre Salinger, Kennedy's press officer, "that politics or political considerations have no legitimate role in considering problems as universal as those of scientific scope."

Vice President Richard M. Nixon consults with Dr. George B. Kistiakowsky, chairman of the President's Science Advisory Committee and head of the department of chemistry at Harvard University. The physical chemist is one of the many science experts both in and out of Administration circles with whom the Vice President consults.

Herbert Klein, Nixon's press officer, said, "The political leanings of these men certainly play no part in his choice. What he wants is the necessary background essential to intelligent decision."

In the area of space and on matters of international exchange, Mr. Nixon has consulted Dr. Joseph Kaplan, former U. S. chairman for the International Geophysical Year and head of the department of physics at the University of California, Los Angeles.

Mr. Nixon finds Dr. Kaplan a man with an "extremely practical viewpoint," according to Mr. Klein.

Sen. Kennedy's expert on space is Dr. Bruno Rossi, an authority on cosmic rays and a world-famous physicist at Massachusetts Institute of Technology.

Dr. David Frisch, a nuclear physicist also at M.I.T., is the authority for Sen. Kennedy on defense and disarmament.

Vice President Nixon benefits from information on space from Dr. Keith Glennan, National Aeronautics and Space Administrator.

On scientific questions of defense and disarmament, the Republican presidential hopeful listens to Dr. Edward Teller, associate director of the Lawrence Radiation Laboratory at Berkeley, Calif. He has also discussed these problems with Thomas E. Murray, former member of the Atomic Energy Commission, appointed by President Truman.

On matters of health and medical welfare, the Vice President is continuously advised by Arthur S. Flemming, the Secretary of Health, Education and Welfare, and his staff.

Sen. Kennedy takes his medical advice in politics from Dr. Dean Alexander Clark, head of Massachusetts General Hospital in Boston and professor of preventive medicine at Harvard Medical School.

• Science News Letter, 78:114 August 20, 1960

MEDICINE

Saved by Hole in Head

➤ A SMALL, EXTRA HOLE in the head may mean the difference between survival and death for patients about to be operated on for tumors or blood clots in the brain.

Dr. Richard Ford, assistant professor of legal medicine at Harvard Medical School, and Dr. Edward L. Spatz, professor of neurosurgery at Boston University School of Medicine, report that increased pressure inside the skull, caused by space-consuming tumors or clots, pushes the brain out of shape.

In some cases, they believe, the aqueduct of Sylvius—a canal that connects two of the brain's ventricles or natural hollow spaces—becomes obstructed. Cerebrospinal fluid becomes trapped in one of the ventricles and takes up more space and causes even more pressure.

When an incision is made for tumor removal, the brain may bubble out through the opening. This, in effect, is like clamping off or strangling the protruding portion of the brain, which may suffer from lack of oxygen.

Under these conditions—with the brain straining against the skull—it is difficult for the surgeon to get the space "desperately needed for proper exploration and definitive treatment."

When and if he does succeed in removing the lesion, brain swelling "allows cerebral ischemia (oxygen shortage) to continue, leading to more swelling—an often fatal cycle."

The doctors believe that relieving the pressure by drilling an extra hole in the skull and draining out the excess fluid or "water on the brain" before the operation starts "may be most profitable."

The technique is to cut a slit about one and one-half inches long in the top of the head, back of the hairline. A tiny hole is drilled through the skull and a thin rubber tube is passed down through the brain, into the ventricle on the side opposite the tumor or clot.

To keep the trapped fluid from squirting out, the doctors clamp down on the tube and let it drain out slowly. In some cases they have removed about one-fourth cup of fluid.

Almost immediately, the brain volume is reduced and the usual incision can be made to remove the tumor. To relieve postoperative swelling, the tube or catheter is stitched to the scalp and left in place for about three days, the doctors report in the New England Journal of Medicine, 263:263, 1960.

This draining of the ventricle is technically known as ventriculostomy. In a case report, the doctors say the procedure was carried out under local-infiltration anesthesia, and the patient awakened on the operating table. Despite full clinical recovery, X-rays showed there was still some brain displacement in this patient two weeks after operation.

• Science News Letter, 78:114 August 20, 1960

ROCKETS & MISSILES

U. S. Recovers Capsule From Discoverer XIII

➤ DISCOVERER XIII was fired into a polar orbit from Vandenberg Air Force Base in California. A 300-pound capsule was scheduled to spin back to earth from the 1,700-pound capsule on its 17th pass over the poles.

U. S. officials hoped that this satellite would be successful. Only six of its predecessors had got into orbit. None of the bell-shaped capsules had been recovered.

The Air Force said the Discoverer, at its farthest point, was 436 miles from the earth. At its closest approach, it was 161 miles away.

Precise instruments inside the capsule were designed to let ground observers keep track of what was going on in the satellite at the time of ejection 200 miles over the North Pole. The capsule was to begin its looping fall then and drop down south of Hawaii.

The ejection went as scheduled on Aug. 11, a day after the Discoverer went into orbit. Its path from outer space was almost exactly that planned on. Dropping into the ocean, the capsule sent out radio and light signals.

Three hours later, helicopters arrived to pick up the undamaged capsule. Observers saw in the recovery—the first made of any man-made object from orbit—an important "first" in the space race.

But more than that, the success meant the United States now has a proved method of getting men from outer space.

• Science News Letter, 78:114 August 20, 1960

ROCKETS & MISSILES

Presidential Message Bounced From Echo I

➤ A 100-FOOT-DIAMETER inflatable "balloon" satellite, Echo I, was launched into orbit Aug. 12 and then used to bounce President Eisenhower's voice from coast to coast to prove its value as a "radio mirror." The satellite was a sphere of plastic, coated with aluminum.

Eisenhower's message proclaiming "one more significant step" in space research was transmitted from the Jet Propulsion Laboratory Station at Goldstone Lake, Calif., via Echo, to the Bell Telephone Laboratory at Holmdel, N. J.

• Science News Letter, 78:114 August 20, 1960

MEDICINE

Measles Vaccine Hopeful

Inoculations of live measles virus vaccine may provide infants with lifelong immunity to measles, one of the most serious of the common childhood diseases.

▶ INOCULATING INFANTS with live measles virus vaccine may provide safe, lifelong immunity to measles, new research indicates.

Measles is one of the most serious of the common childhood diseases. It has caused more deaths annually in recent years than polio.

Among the crippling secondary infections that may follow the onset of this disease is encephalitis, a dreaded brain inflammation that may result in death or permanent mental disability. Infections of the middle ear may cause deafness. Pneumonia is another possible complication from measles that is a major cause of death.

The promising results of tests with live measles virus vaccine inoculations on 13 infants from four to 13½ months of age was reported in the New England Journal of Medicine, 263:230, 1960, by Drs. Joseph Stokes Jr., Charles M. Reilly, Maurice R. Hilleman and Eugene B. Buynak.

The virus used was furnished by virologist Dr. John F. Enders of Harvard University, a Nobel Prize winner in 1954 for his pioneer efforts in polio virus culture.

The group was selected to include children six months or younger who still might possess the natural maternal measles antibodies in order to determine whether the antibodies would be a barrier to the vaccine virus.

The small amount of maternal measles antibodies still present in the younger infants appeared in fact to neutralize the vaccine virus.

Among the susceptible older infants, there was no evidence of complication. The disease among this group was far milder after vaccination than the illness that accompanies the natural disease and, the scientists state, "is certainly to be preferred, providing that the immunity is lifelong or, if not, that waning immunity can be effectively reinforced."

The scientists suggest a killed virus vaccine for reimmunization purpose as probably "more applicable when an antibody is present."

The research project was jointly sponsored by the department of pediatrics of the University of Pennsylvania School of Medicine and the Children's Hospital of Philadelphia, and the division of virus and tissue culture research, Merck Institute for Therapeutic Research in West Point, Pa.

• Science News Letter, 78:115 August 20, 1960

MEDICINE

Immunize Against Insects

▶ TWO WOMEN PHYSICIANS regularly grind up insects' venom sacs in an unusual search for better materials to protect sensitive persons from serious illness or death from insect stings.

Commercially available shots, utilizing whole insects ground into a preparation, have been only partially successful.

But under grants from the National Institutes of Health and other groups, the two women have done a unique job of immunizing against insects.

In Washington, Dr. Halla Brown, associate professor of clinical medicine and chief of the section on allergy at George Washington University, goes out every fall to collect specimens to grind up for use the following season.

Her former colleague, Dr. Mary H. Loveless, associate professor of clinical medicine at Cornell University Medical College in New York, continues to work on a more or less experimental basis.

In an interview, Dr. Loveless said she attributes some firemen's deaths to their allergies. They may be stung by wasps whose nests they disturb under the eaves of houses or in attics. Because insect bites are hard to see, such deaths are sometimes attributed to heart attacks.

"I always give tests to my patients to determine the level of their allergy," Dr. Loveless said. "Most of the treatments I give require about two and a half hours. I usually begin with one-tenth of a sac of venom and during the treatment period, I increase the shots at half-hour periods until the final shot is usually made up of two full venom sacs."

Both Drs. Brown and Loveless encounter patients who are rendered unconscious within 20 minutes after being stung by some type of insect to which they are allergic. Some die within a few seconds. But if they survive, they can be given immunity shots year after year.

The yellow jacket is the most common offender, but the Polistes wasp comes next. This is the type commonly seen in attics and under eaves.

Since 1947 Dr. Loveless has been working not only with insect venoms but with pollens to immunize against hayfever. Dr. Brown also has worked with pollens.

Pollen extract is emulsified in mineral oil and stabilized with materials that retard the release of watery allergen into the body from muscle or other areas. This slowed release permits injection of 10 to 20 times more allergen than otherwise could be tolerated.

The same technique also permitted Dr. Loveless for the first time this year to inoculate patients with a full dose of six venom sacs at one time without harmful results.

• Science News Letter, 78:115 August 20, 1960

TECHNOLOGY

New Tunnel Diode Is Fastest Switching Device

▶ AN IMPROVED TUNNEL DIODE that could conceivably count ten billion one-dollar bills in a second or make computer decisions with equal speed is believed the world's fastest switching device.

The device, introduced this month by the Radio Corporation of America, is one of four new types available commercially.

The Department of Defense is studying these new tunnel diodes with a view to developing a computer that will operate at a speed of a billion cycles a second—100 times faster than computers now in existence.

Because of their tremendous speed, the new diodes are expected to have wide use in a variety of electronic systems, including data processing, missiles, satellites and various communications equipment.

Tunnel diodes are tiny solid-state devices no bigger than the head of a match. They control the flow of electrons that make up an electrical current, and do so much faster than an electron tube or a transistor. They are called tunnel diodes because of the manner in which electrons seem to "tunnel" through them with the speed of light.

Theoretically it is possible for this particular device to switch, or "to make decisions" ten billion times a second. One of them is 50 times faster than the fastest transistor.

• Science News Letter, 78:115 August 20, 1960

MARCONI MEMORIAL — This granite column at Poldhu, Cornwall, Eng., marks the spot from which Marconi transmitted the first radio signal across the Atlantic Ocean in December, 1901.

ASTRONOMY

Fair Project Patented

➤ THE SCIENCE FAIR PROJECT of a teen-aged National Science-Fair International finalist has been granted a patent, No. 2,948,189, under the title of "Reflecting Telescope With Interchangeable Optical Systems."

The young inventor, Robert E. Fischer of Forest Hills, N. Y., said, "My invention was conceived entirely as a result of my entry in the School Science Fair sponsored by the American Institute of the City of New York."

This fair is one of some 200 regional, state and nation-wide, and area science fairs affiliated with the National Science Fair-International, conducted by SCIENCE SERVICE.

Last year, when Bob was 15 years old, he designed and built the telescope and the interchangeable optical systems that allow automatic and very fast photography of heavenly bodies.

Because the rotation of the earth moves objects out of the field of vision before a sighting can be made and the camera put in place on a telescope, complicated clock mechanisms previously were necessary for successful astrophotography. Bob's invention is designed specifically to solve such problems. At the desired instant, the diagonal of the telescope is shifted 90 degrees, immediately tripping the shutter of the attached camera.

A spectroscope, camera or optical system may be easily positioned on the reflecting telescope. All parts are detachable and can be interchanged rapidly and conveniently.

The telescope won top honors at the American Institute's School Science Fair-Borough of Queens, where the inventor was selected as a finalist to the Tenth National Science Fair-International in 1959. At the national event Bob's project earned him a Fourth Award and designation as a national Navy Science Cruiser, Air Force winner in Air Exploration and Honorable Mention of the Instrument Society of America.

This year Bob again was named a finalist to the National Science Fair-International for his project "Electronic Astronomical Spectrum Analyzer," which uses a spectroscope mounted on a telescope and a photomultiplier to magnify the spectrum one million times. The magnification is electronically recorded on an oscilloscope, providing immediate scanning. Bob now has applied for a patent on this analyzer.

He is spending the summer at the optical division of Hayden Planetarium at the American Museum of Natural History in New York, where he is working on his next science fair project designed to produce instantaneous spectra of stars.

• Science News Letter, 78:116 August 20, 1960

PHYSICS

Politics Stopped Test Ban

➤ POLITICS, not science, is behind the recent Soviet rejections of Western proposals for control plans for a workable nuclear test ban agreement, Secretary of State Christian A. Herter believes.

"Their rejections have not been on scientific grounds at all. They have been on purely political grounds," he said.

Secretary Herter noted that at a meeting of the scientist representatives of Britain, the Soviet Union and the United States last May in Geneva, "a complete accord" had been reached on a plan for a coordinated test series for control purposes.

"That accord," he said, "while it was never reduced to any more than a recommendation to the Commission, was completely kicked overboard by the Soviets on political grounds and they said . . . that the agreement of the scientists had no standing whatsoever."

Secretary Herter said he was "hopeful" that an agreement with the Russians might be reached in this area, despite discouraging obstacles. He told a news conference that the U. S. is "considering certain alternatives that might be offered" the Soviets so that a control test series essential to any agreement could be carried on.

Among these alternatives is a request to Congress from the Administration to declassify certain information now secret under the Atomic Energy Act of 1954 and make it available to the Russians so that they may agree to a series of underground atomic tests to improve seismic detection and control.

Herbert Klein, press secretary for Vice President Nixon, was asked how the Vice President would view such a request.

He said, "The Vice President makes it a policy not to comment on any matters that may be a part of important international negotiations currently pursued."

Sen. John F. Kennedy, Democratic Presidential nominee, could not be reached for comment.

• Science News Letter, 78:116 August 20, 1960

PHYSICS

Atomic Blast Wave Can Be Made in Cone

➤ A SMALL CHARGE detonated in a cone-shaped shock tube can produce blast waves as powerful as those generated by the atomic bomb dropped over Hiroshima, a scientist at the Naval Ordnance Laboratory, White Oak, Md., has found.

The conical shock tube method enables physicists to study the effects of blast waves under laboratory conditions without having to work in remote areas. It was developed by William S. Filler, an NOL physicist.

When a small charge is fired in the tip of a cone, the blast waves it generates represent a small part of the spherical shock waves generated when a much larger charge is fired in the open.

Experimental results of tests so far made show that blast waves equivalent in magnitude to those from atomic weapons are possible with the cone-shaped tubes. To simulate the equivalent of the Hiroshima atomic bomb would require detonating a 1,000-pound charge of TNT in a cone 2,000 feet long, having an angle at the tip of one-half degree.

Probably the most important advantage of the cone method, Mr. Filler reported, is that "the experimental problems of studying high explosive blasts in a variety of fluid media are expected to be drastically simplified in future studies with the cones."

• Science News Letter, 78:116 August 20, 1960

SCIENCE NEWS LETTER
VOL. 78 AUGUST 20, 1960 NO. 8

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., NOrth 7-2255. Cable Address: SCIENSERVC.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; ten or more copies in one package to one address, 7½ cents per copy per week; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright © 1960 by Science Service, Inc. Republication of any portion of SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicated services issued by Science Service. Science Service also publishes CHEMISTRY (eight times a year) and THINGS of Science (monthly).

Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: William W. Rubey, U. S. Geological Survey; Wallace R. Brode, Department of State; Douglas Whitaker, Rockefeller Institute for Medical Research. Nominated by the National Academy of Sciences: Harlow Shapley, Harvard College Observatory; Philip Bard, Johns Hopkins University; Henry Allen Moe, John Simon Guggenheim Memorial Foundation. Nominated by the National Research Council: Leonard Carmichael, Smithsonian Institution; John R. Dunning, Columbia University; Benjamin H. Willier, Johns Hopkins University. Nominated by the Journalistic Profession: Michael J. Ogden, Providence Journal-Bulletin; O. W. Riegel, Washington and Lee University; Lee Hills, Detroit Free Press. Nominated by the Scripps Estate: Edward J. Meeman, Memphis Press-Scimitar; Frank Ford, Washington, D. C.; Charles E. Scripps, Cincinnati, Ohio.

Officers—President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: Wallace R. Brode; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Gloria Ball, Ann Ewing, W. T. M. Grigg, Faye Marley, Jane Marye, Tove Neville, Marjorie Van de Water. Science Youth Division: Joseph H. Kraus, Shirley Moore, Dorothy Schriver. Photography: Fremont Davis. Production: Priscilla Howe, Marcia Nelsen. Syndicate Sales: Hallie Jenkins. Interlingua Division in New York: Alexander Gode, 80 E. 11th St., GRamercy 3-5410. Advertising Manager: Fred A. Moulton, MEtropolitan 8-2562.

POPULATION

Birth Control Policy Urged

Director of the population research training center at the University of Chicago warns that the population explosion threatens our standard of living.

A NATIONAL POLICY of birth control may be required to overcome the serious and dangerous consequences of the current growing population explosion in the United States, Dr. Philip M. Hauser, director of the population research training center at the University of Chicago, warns.

The simultaneous increase in the birth rate and decrease in the death rate has added about 48,000,000 persons to the U. S. population in the past 20 years.

"As a matter of sound national policy," Dr. Hauser says, "it seems clear that we cannot indefinitely maintain our present national rate of increase—a rate which would double our population in less than 40 years."

He says the "advantages of death control can be maintained only if accompanied by compensating birth control."

Dr. Hauser's statements appear in the Population Bulletin of the Population Reference Bureau, Inc., 16:92, 1960.

The U. S. population explosion is most evident in the increased size of urban centers. Although this growth has brought with it many material and cultural advantages, it also has "precipitated or worsened" such social disorders as "family disorganization, delinquency, alcoholism, drug addiction, unemployment and political corruption."

Dr. Hauser estimates that juvenile delinquency in the 15- to 19-year age group will increase in the 60's by 44% "by reason of the increase in the size of the age group alone."

The number of economic dependents is rising as a consequence of the postwar baby boom. The population expert says this has produced for the first time in the U. S. "a situation in which mouths are growing more rapidly than hands."

Improved technology and increased investments have maintained living levels. But Dr. Hauser warns that "population factors, for the first time in our national history, are clearly operating to decrease levels of living."

Metropolitan areas are faced with the serious problem of urban renewal and new and expanded housing and other facilities to accommodate the burgeoning population.

At current per capita costs for urban services, $33 billion must be invested in this decade alone "merely to provide such services for the anticipated increase in the metropolitan area population."

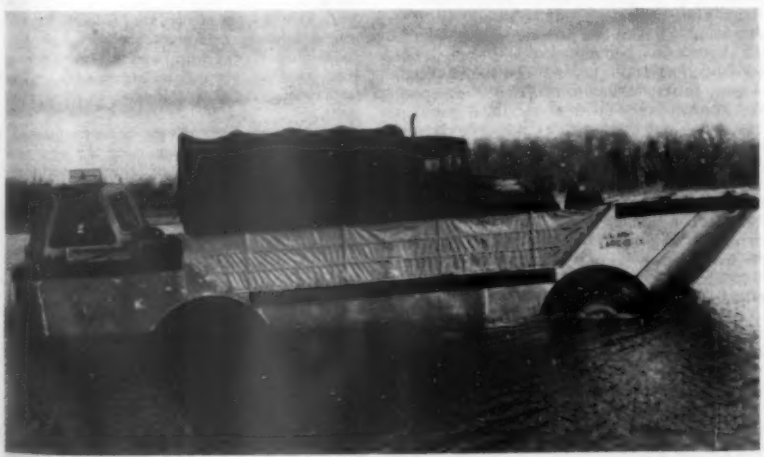
Population expansion already has meant traffic congestion of proportions that will make "inevitable" a return to mass transit, "involving tremendous private and public outlays."

Dr. Hauser lists the expansion of Government functions on local, state and Federal levels as one of the great costs of this expanded urban growth. He says that the increased complexities involved in urbanism "as a way of life . . . bring more regulation, paradoxically enough, to preserve our freedom."

The Chicago authority on the growth of human societies also cautions against those who favor expanding population as a security measure and urge on this basis that we "outbreed" our potential enemies.

Dr. Hauser says, "A competition in breeding between the Free World and the communist bloc could only reduce us more rapidly to their miserably low level of living and would invite, rather than retard, the expansion of Communism."

• Science News Letter, 78:117 August 20, 1960



THE LARC-15—After a test run on land and water from Kalamazoo to Chicago, this aluminum "cargo lighter" is ready for business. The combination cargo and personnel carrier for ship-to-shore deliveries was developed by the U. S. Army Transportation Research Command. The LARC-15 derives its name from "Lighter, amphibious, resupply, cargo."

MEDICINE

Home Care Program Cuts Cancer Costs

THE BURDENSOME COST of cancer is reduced and patients' morale improved through a home care program of the George Washington University Cancer Clinic, Washington, D. C. The program includes regular visits by physicians, nurses and social workers.

The program, designed for patients who are too ill to attend the clinic and who do not require continuous hospital care, is praised in the Journal of the American Medical Association, 173:1530, 1960, by Dr. Cyril A. Schulman, director of the home care work of the clinic.

"Apparently such things as devotion, comforts of home and catering to one's whims of diet do make for a decided difference in the patient's health and attitude," he says.

• Science News Letter, 78:117 August 20, 1960

MEDICINE

Babies of Drug Addicts Born With Narcotic Habit

A NEWBORN BABY'S addiction to morphine or one of its derivatives such as heroin may begin many months before it is born.

Two New York University pediatricians, Drs. Annabelle Vincow and Alvin Hackel, report in GP, 22:90, 1960, published by the American Academy of General Practice, that 12 drug-addicted infants were born at Bellevue Hospital during a recent nine-month period. One study, on a group of untreated cases, showed a 93% death rate.

The babies had been getting opiates from their mothers' systems before birth. They suffered withdrawal tortures after they were born. Their nervous systems became violently overactive. In severe cases they had convulsions and died.

The two physicians recommend that such babies remain hospitalized, be allowed to breathe moist oxygen and be fed through a nasal tube or intravenously because they are often nauseated and ignore bottles.

As with many adults, drug substitutes must be used and then slowly withdrawn.

Drs. Vincow and Hackel urge obstetricians to check the mothers for signs of addiction before the babies are born. If the mother can go without drugs for a week or ten days prior to delivery, the baby usually will not suffer withdrawal symptoms.

• Science News Letter, 78:117 August 20, 1960

CHEMISTRY

Laws of Matter Up-to-Date

Copyright © 1945, 1948, 1956, 1957, 1960 by SCIENCE SERVICE, INC.

1. A single ATOM is the tiniest particle of any chemical element that can exist by itself and retain the qualities that mark it as that element.

2. All material things in the universe known to our senses are composed of atoms of CHEMICAL ELEMENTS.

3. Substances composed of more than one element are known as COMPOUNDS. Atoms attract and hold each other by electrical forces.

4. The smallest theoretical unit of a compound, composed of two or more atoms, is known as a MOLECULE; some elements are also normally found as molecules or crystals.

5. The smallest actual units of crystalline compounds found by use of microscopes and electron microscopes seem to be structures built up of the different atoms alternating in three-dimensional patterns to form the CRYSTAL LATTICE.

6. There were believed to be 92 CHEMICAL ELEMENTS, from hydrogen $_1H^1$, the lightest, to uranium, $_{92}U^{238}$, the heaviest, before the discovery of nuclear fission.

7. Two new elements, NEPTUNIUM, $_{93}Np^{239}$, formed by the neutron bombardment of uranium 238, and PLUTONIUM, $_{94}Pu^{239}$, formed by deuteron bombardment of uranium 238, were discovered two years thereafter.

8. Additional new elements have since been created by atomic bombardment, using the cores of light elements as projectiles. As of 1960, elements through 102 have been added, the ones beyond plutonium being: AMERICIUM, CURIUM, BERKELIUM, CALIFORNIUM, EINSTEINIUM, FERMIUM, MENDELEVIUM, and element 102.

9. When elements are represented, as above, by their chemical symbols, the subscript number is the ATOMIC NUMBER. This is different for each element. The superscript number is the MASS NUMBER, and also the total number of protons plus neutrons, or the ATOMIC WEIGHT rounded off to the nearest whole number.

10. All atoms are composed of standard interchangeable parts. These are PROTONS, NEUTRONS and ELECTRONS.

11. Protons and neutrons make up the NUCLEUS of the atom. Collectively, they are called NUCLEONS. The structure of the atom is comparable to that of the solar system. The nucleus corresponds to the sun at the center. The planets are electrons.

12. The ELECTRONS, light in weight and some distance away from the nucleus of the atom, revolve around the nucleus. They are held in their courses by electric attraction.

13. The proton has a POSITIVE charge of electricity, the electron has a NEGATIVE charge equal and opposite to the positive charge of the proton. The neutron has no charge at all.

14. The proton and the neutron each have a mass of about one ATOMIC MASS UNIT. Each is about 1800 times heavier than the electron.

15. ATOMIC NUMBER is the measure of the electric charge on, or number of protons in, the nucleus of the atom.

16. The difference in CHEMICAL PROPERTIES of the elements is caused by difference in the number of electrons, which in turn is caused by difference in the number of protons in the nucleus. The number of electrons is equal to the number of protons in an electrically neutral atom.

17. Chemical VALENCE, or combining power, is governed primarily by the electrons in the outermost orbits of each atom. Characteristics of transition elements are also governed by electrons in the next-to-outermost shell.

18. MASS NUMBER is the total number of protons and neutrons in the nucleus.

19. ATOMIC WEIGHT is the measure of the atom's mass.

20. Different atoms of the SAME ELEMENT are sometimes found to have DIFFERENT ATOMIC WEIGHTS. Such atoms are called ISOTOPES.

21. In all other ways ISOTOPES are chemical twins, alike except for weight. They have the same ATOMIC NUMBER, but have different numbers of neutrons.

22. Every element has been found to have a number of isotopes, some STABLE, some RADIOACTIVE.

23. Atomic weights of individual ISOTOPES are usually given relative to the most abundant isotope of oxygen, $_8O^{16}$, taken as 16.00000 atomic mass units (physicists' scale).

24. There are two scales of ATOMIC WEIGHTS, physical and chemical. In the physical atomic weight scale, the mass of an atom of O^{16} is used as the standard and assigned a mass of 16.00000 units. In the chemical atomic weight scale, the atomic weight of the natural isotopic mixture of oxygen, which contains O^{17} and O^{18} in addition to O^{16}, is assigned the value of 16.00000.

25. Different elements, quite distinct in chemical behavior, may have isotopes of the same atomic weight. There are $_{92}U^{239}$, $_{93}Np^{239}$, $_{94}Pu^{239}$, $_{95}Am^{239}$ and $_{96}Cm^{239}$, all with different properties. Such atoms are called ISOBARS.

26. It is the NEUTRON which figures in the transmutations that give atomic power from uranium. Neutrons can PENETRATE to the nucleus of heavy atoms when charged particles would be repelled by charges in the atom. The neutron is absorbed by the nucleus to form a heavier nucleus that is frequently unstable. If it is unstable, it then decomposes radioactively, usually emitting an electron and changing to a different element one atomic number greater.

27. The HYDROGEN atom, $_1H^1$, has just one proton as its nucleus, with one electron circling around it. Hydrogen's atomic weight and atomic number are each one.

28. Hydrogen has a rare istotope, $_1H^2$, that is just like ordinary hydrogen except it is twice as heavy. It is known as "heavy hydrogen" and sometimes as DEUTERIUM (Symbol: D). Its compound with oxygen is called "heavy water."

29. The nucleus of DEUTERIUM, called a DEUTERON, contains one proton and one neutron. The atomic number of heavy hydrogen is one, corresponding to one proton. The atomic weight is two, corresponding to the two heavy particles, proton and neutron. A third form of hydrogen, the radioactive isotope TRITIUM, $_1H^3$, is composed of one proton and two neutrons.

30. HELIUM, $_2He^4$, has two protons and two neutrons in its nucleus. The two protons correspond to helium's atomic number two. The combined weights of protons and neutrons in the nucleus give helium its atomic weight four. Two electrons, held in their orbits by the two protons, revolve around the nucleus.

31. Helium 4 at temperatures near absolute zero is a liquid with most remarkable properties and is the only known SUPERFLUID.

32. Helium also has a rare lighter isotope, $_2He^3$, composed of two protons and one neutron.

33. Uranium has a number of isotopes. The most abundant, whose atomic weight is 238, was used to produce the new elements. U-235 was used to make the ATOMIC BOMB.

34. The isotope U-235 and the element plutonium can be used for bombs because they are capable of FISSION after absorbing a neutron.

35. When fission occurs, the nucleus of the atom SPLITS into two (occasionally more) lighter elements, with release of nuclear energy.

36. In some recent experiments with high-powered cyclotrons, even more thorough fragmentation of atomic nuclei resulted. This process, resulting in many light elements, was named SPALLATION. General laws are now known that explain the processes by which atoms and nuclear particles unite and divide to form isotopes of particular mass, form and radioactive lifetimes.

37. FUSION, the process by which stars obtain their energy, is a nuclear reaction in which light nuclei combine to form a nucleus of a higher mass number, releasing large amounts of energy. The process can be said to be the opposite of nuclear fission. Fusion forms the basis of the hydrogen bomb. The possibility that the virtually limitless fuel locked as forms of hydrogen in the world's ocean can be tapped by the controlled release of fusion is under extensive investigation throughout the world.

38. MESONS are short-lived particles intermediate in mass between electrons and nucleons. HYPERONS are particles intermediate in mass between nucleons and deuterons. Their role in holding particles together in the atomic nucleus is being investigated.

39. The VOLUME of an atom is determined by the orbits of its outermost revolving electrons. Only a small fraction of the size of an atom is actually occupied by the protons, neutrons and electrons, somewhat as the space occupied by the sun, the earth and other planets is only a small part of our solar system.

40. In spite of all the unoccupied space, an atom is quite IMPENETRABLE to other atoms and to larger bodies. The electrons revolve millions of times a second, and keep everything out of the space within quite as effectively as though they were everywhere at once.

41. The things that can get inside an atom easily are protons, neutrons or electrons and fragments of other atoms. They must be shot with sufficient SPEED.

42. RADIATION is wave motion, known to us as the electromagnetic waves used for radio transmission, heat, light, X-rays, gamma rays, and as beams of atomic particles. Extremely tiny particles act like waves.

43. Three types of rays are given off by radioactive substances. ALPHA particles are high-speed nuclei of helium atoms. BETA particles are high-speed electrons. GAMMA RAYS are electromagnetic radiations similar to X-rays and light.

44. Of these, only the gamma rays used to be called radiation, and even these act very much like particles because of their short wavelength. Such a "particle" or quantum of electromagnetic radiation is called a PHOTON.

45. All atoms, when excited by high temperatures or by electric discharge, may emit light rays. These light rays, sorted according to wavelength with spectrographs, make up the SPECTRA characteristic of the elements. Most of our information about the outer structure of atoms is derived from these spectra.

46. Electrically charged particles, such as electrons, may be bent out of their straight-line paths by the influence of a magnet. This principle is used in the construction of the CYCLOTRON.

47. POSITRONS are like electrons, but are bent in the opposite direction because their charges are positive instead of negative. Thus a positron is an "anti-electron."

48. Scientists now know that atomic particles as well as mesons and hyperons have so-called "anti" forms, which denote another particle with most of the same characteristics but differ-

ing in others, including charge and magnetic moment. When normal matter collides with ANTI-MATTER, both are annihilated and tremendous amounts of energy are released.

49. The kind of rays emitted and the HALF LIFE (the time in which half the radioactivity decays) are constant characteristics of each radioactive isotope, and are used to identify that isotope.

50. In general, the gamma rays are very PENETRATING, beta rays less so, and alpha particles are easily stopped. Even though the alpha and beta rays are not very penetrating, they have enormous speed.

51. ENERGY is capacity to do work. It is work stored up for future use.

52. If you raise a weight to a height above the ground and suspend it there by some device, the WORK you put into raising it can be stored there indefinitely as POTENTIAL ENERGY. It will be there, ready, whenever you decide to release it.

53. The energy that a moving body has because it is in motion is called KINETIC ENERGY. The kinetic energy of any particle depends upon its mass and its velocity. When the moving particle strikes an object, work is done.

54. Particles of atomic size have kinetic energy arising from several different kinds of MOTION. All atoms are constantly in motion.

55. If the atoms are so dispersed that the material constituting them is a GAS, that gas will exert pressure on all sides of the container holding it, because of the motion of the gas molecules.

56. Atoms composing an element that will combine readily with another element, as hydrogen or carbon will combine with oxygen, have incomplete arrangements of the outer electrons in their systems. These incomplete arrangements allow CHEMICAL COMBINATION to take place when elements with suitable combining powers are brought together.

57. When chemical reactions occur, energy can be absorbed or released in the process. Reactions in which energy is absorbed are called ENDOTHERMIC REACTIONS; those in which energy is released are called EXOTHERMIC REACTIONS.

58. Chemical energy, electricity and heat are all forms of ENERGY. Potential and kinetic energy may be distinguished in each case.

59. These energies all arise from motion of the atom as a whole, or motion resulting from attractions and repulsions between the outer ELECTRONS of the atom's structure.

60. Energy resulting from changes in the nucleus of the atom was unknown until the discovery of RADIOACTIVITY.

61. Radioactive isotopes undergo SPONTANEOUS breaking up of their nuclei, giving off beta, alpha or gamma radiation. Loss of these particles causes the radioactive isotopes to change into isotopes of other elements.

62. The energies shown in these TRANSMUTATIONS are millions of times greater than the kinetic energies the molecules of a gas have by reason of their motion when heated. They are about a million times greater than the energy changes per atom in chemical reactions.

63. The property of matter that connects it with motion is INERTIA. Inertia is resistance to change of motion and is the measure of the MASS of an object.

64. One conclusion that appeared early in the development of the theory of RELATIVITY is that the mass of a moving body increases as its speed is increased.

65. This increase implies an equivalence between an increase in energy of motion of a body (kinetic energy) and an increase in its MASS.

66. It is for this reason that Einstein suggested that studies of radioactivity might show the EQUIVALENCE of mass and energy.

67. Einstein's statement is that the amount of energy, E, equivalent to a mass, m, is given by the equation $E = mc^2$, where c is the VELOCITY OF LIGHT.

68. From this equation, one kilogram (2.2 pounds) of matter, if CONVERTED entirely into energy, would give 25 billion kilowatt hours of energy.

69. The heat produced by BURNING one kilogram of coal is 8.5 kilowatt hours of energy.

70. Two axioms of physics state: (1) MATTER can be neither created nor destroyed; (2) ENERGY can be neither created nor destroyed. For all practical purposes they were true and separate principles until about 1940.

71. It is now known that they are, in fact, TWO PHASES of a single principle, for we have discovered that energy may sometimes be converted into matter and matter into energy.

72. Such conversion is observed in the phenomenon of nuclear FISSION, a process in which atomic nuclei split into fragments with the release of an enormous amount of energy.

73. The extreme size of the CONVERSION FACTOR explains why the equivalence of mass and energy is never observed in ordinary chemical combustion.

74. We now believe the heat given off in chemical COMBUSTION has mass associated with it, but this mass is so small it cannot be detected by the most sensitive balances available.

75. From the standpoint of the Laws of the Conservation of Matter and of Energy alone, transformation of matter into energy results in the DESTRUCTION of matter and CREATION of energy.

(Compiled originally by Helen M. Davis; revised 1960.)

• Science News Letter, 78:118 August 20, 1960

Reprints of *LAWS OF MATTER UP-TO-DATE* . . . Postpaid 10¢ each, 100 copies for $3.

TECHNOLOGY

TV Helps Mine Recovery

➤ AN UNDERWATER TELEVISION camera is helping the Navy to recover valuable ordnance units from the ocean floor at depths where divers cannot safely operate.

The camera guides a 12-ton shipboard crane in quickly retrieving air-dropped or submarine-laid mines from a test area of the Naval Ordnance Laboratory Test Facility at Fort Lauderdale. The area is three miles off-shore.

The mines under test are developed by the Naval Ordnance Laboratory, White Oak, Silver Spring, Md., and then sent to the NOLTF at Fort Lauderdale for full-scale sea trials.

When mines are planted, their location is pinpointed by two spotting towers situated about three miles apart on the beach. This information is relayed to a recovery ship that anchors directly over the area and lowers the camera assembly to search the ocean floor.

Once on the bottom, the TV unit rotates in a full 360-degree circle and scans from the ocean floor beneath the camera assembly to almost directly above it in a 100-degree arc. Objects more than 75 feet away at 360-foot depths can be spotted by the camera's wide-angle lens under good natural light conditions. Natural light is preferable to artificial light because the tiny plankton life in the seawater reflects artificial light, clouding the TV picture.

• Science News Letter, 78:119 August 20, 1960

RECOVERED MINE—Guided by an underwater television camera, a 12-ton crane on a U. S. Naval Ordnance Laboratory recovery ship hauls up a mine in a clamshell bucket near Fort Lauderdale, Fla. The mine was spotted in 360 feet of water.

RADIO ASTRONOMY

New Method Found for Large Radio Telescopes

➤ A LARGE RADIO TELESCOPE can be made by mathematically combining the radio information received on two smaller radio telescopes. This new method has been developed by two astronomers at the Cavendish Laboratory in Cambridge, England.

Drs. M. Ryle and A. Hewish devised the synthetic radio telescope to obtain increased resolving power. Many investigations of the sources of radio waves in the heavens are limited by the resolving power that can be achieved by conventional methods of constructing the receiving antennas.

To overcome such limitations, Drs. Ryle and Hewish developed a method by which two antennas are so arranged that their relative positions can be altered to occupy successively the whole area of a much larger equivalent aerial.

The results of such observations are then combined mathematically, they report in the Monthly Notices of the Royal Astronomical Society, 120:220, 1960, published in London.

The new method of obtaining increased resolving power can be applied to both "pencil beam" systems and interferometers. An interferometric system designed for the study of radio sources has been built with an equivalent area for resolution of 800,000 square feet.

• Science News Letter, 78:119 August 20, 1960

TECHNOLOGY

Subsonic Wind Tunnels Aid in Research

➤ AIR TRAVELING slower than the speed of sound is being critically examined in an unusual wind tunnel built in Linden, N. J., by scientists of the Esso Research and Engineering Co.

Less generally heard about than supersonic wind tunnels that are used in aircraft testing, subsonic wind tunnels are important in determining facts about air pollution and air conditioning, and for checking aerodynamic shapes used in industry.

A special design gives one of the widest ranges of air flow from a subsonic tunnel in existence. An import from the world of music—a Sousaphone bell—gives unusually uniform air flow along the tunnel's throat.

The precise determination and measurement of air patterns has become an important factor in industry, particularly in the petroleum field, according to Richard Brief, who is in charge of the wind tunnel studies.

The new wind tunnel is able to produce and examine air flows ranging from "still air," which actually moves at about 20 feet a minute, to air traveling at 5,000 feet per minute, or at the approximate speed of a small hurricane.

• Science News Letter, 78:120 August 20, 1960

AERONAUTICS

Orbiting Jet Seen As "Ultimate Airplane"

➤ THE "ULTIMATE AIRPLANE," which will fly at 17,000 miles an hour or 25 times the speed of sound, was described by Alexander Kartveli, a Russian-born aircraft engineer responsible for the development of 14 aircraft types.

Mr. Kartveli, now vice president of research and development for Republic Aviation Corporation, told the Institute of Aeronautical Sciences national meeting in San Diego, Calif., that the craft would be the last major type before aircraft makers turn most of their attention from aviation to astronautics.

It will be 170 feet long, 33 feet high and have a wingspan of nearly 99 feet. Its front will be a massive series of air ducts to draw huge quantities of air into four hydrogen-burning engines in combination with four ramjets.

It will be capable of taking off from the ground with a substantial military load, accelerating to orbital speed, orbiting around the earth and landing on earth when desired.

Mr. Kartveli said design consultants for Republic have already done basic exploratory work on the combustion scheme to power such a craft.

He also presented designs for three generations of planes he believes will come before the "ultimate":

1. A fighter-bomber, capable of vertical take-off, that could fly at 1,500 miles an hour. It could pinpoint bombs on a target from 75,000 feet.

2. A nuclear-ramjet strategic bomber, to be produced between 1970 and 1975, that would fly at 2,800 miles an hour and cruise at 85,000 feet. Its two-man crew would be in a shielded compartment. This bomber would eliminate U. S. reliance on allied bases.

3. A 4,960-miles-an-hour bomber, shaped like a great triangle, capable of flight at 120,000 feet. With two ramjet and two turbojet engines, it would have a range of 5,000 miles.

• Science News Letter, 78:120 August 20, 1960

AERONAUTICS

New Jet Lift Fan Shown, Plane Type Predicted

See Front Cover

➤ A LARGE COMMERCIAL TRANSPORT that can take off and land vertically is foreseen by engineers who announced a new "lift fan" propulsion system.

The plane, which would need no runway, could pick up passengers in the center of a city for short trips to nearby cities. The engineers say the plane could be developed by 1970.

It would use a turbojet engine. The engine's thrust would be diverted to the "lift fan," whose rotor is shown on the cover of this week's SCIENCE NEWS LETTER, for take-off and landing. The exhaust gases would turn the fan, which would in turn produce vertical thrust.

The system was shown by General Electric's Flight Propulsion Laboratory Department at the annual meeting of the Association of the United States Army in Washington, D. C.

• Science News Letter, 78:120 August 20, 1960

PSYCHOLOGY

Blonde "Eye-Openers" Dilate Men's Pupils

➤ THOSE CURVY BLONDES referred to as "eye-openers" really are.

Two University of Chicago scientists report a study of six men and women in which the subjects were shown pictures of a partially nude man and a partially nude woman, among others.

The men's pupils, which act like the lens opening on a camera and primarily expand in response to available light, also expanded greatly for the near-nude female, much less for the near-nude male.

The women opened their eyes for the man, reduced their aperture for the female. The women, none of whom had children, opened their eyes widest, however, for a picture of a woman and child.

Dr. Eckhard H. Hess and James M. Polt report in the American Association for the Advancement of Science's journal Science, 132:349, 1960, that their study was limited to six subjects.

To the lines of Guillaume de Salluste, "These lovely lamps, these windows of the soul," the scientists add that there was increasing evidence that the pupils do register directly certain activities of the nervous system.

• Science News Letter, 78:120 August 20, 1960

IN SCIEN

ASTRONAUTICS

Small, Shielded Section Needed in Space Ship

➤ SPACE TRAVELERS may have to squeeze into a tiny, heavily shielded compartment in their space vehicle while going through the earth's radiation belts and through storms of solar protons in space.

Such a protective addition to the operating area of a manned space ship was predicted by J. W. Keller and N. M. Schaeffer, both of the Convair Division of General Dynamics in Fort Worth, Texas. They reported a shielding study to the Pacific General meeting of the American Institute of Electrical Engineers in San Diego, Calif.

The use of a small shielded compartment would eliminate the necessity of heavy shielding for the larger area in which astronauts will be able to live and work once they are past the radiation belts, provided solar protons are not present in large numbers, as they are about ten times a year.

• Science News Letter, 78:120 August 20, 1960

ANIMAL HUSBANDRY

Male Chicks Help Lick Hens' Insect Problems

➤ YOUNG MALE CHICKS are used to eliminate flies around laying hens in a new fly-control system developed by a technician, John Rodriguez, at the University of California, Riverside.

Previous methods have involved the use of poison sprays or mists. However, Mr. Rodriguez' method is to place young male chicks (cockerels) under the cages of the hens.

The cockerels eat almost all fly larvae and pupae, thereby eliminating thousands of potential flies.

The method, in addition to being safer than chemical methods, is less expensive, because hatcheries will provide the males free, as they are unproductive. The rancher raises the chicks in a brooder, inoculates them against disease and releases them under the cages of his hens, where they eat the larvae.

There are three main disadvantages to the older chemical prevention:

1. Chemicals that at one time were effective are becoming less so, due to the building up of an immunity by the flies.

2. Chemical control involves the danger of a toxic residue on birds and eggs.

3. Chemicals are expensive. Also, there is additional cost for application.

On one of the farms that tried Mr. Rodriguez' system on an experimental basis, 750 cockerels were used to control flies among 35,000 laying hens. If the insect problem is severe, however, one chick might be needed for each 10 or 20 hens.

• Science News Letter, 78:120 August 20, 1960

E FIELDS

PUBLIC HEALTH

Farm Chemicals Prove Hazard in California

➤ FARM CHEMICALS have harmed hundreds of persons in California, state health officials report.

As the use of insecticides, chemical fertilizers and soil additives has increased, so has the number of reports of occupational disease attributed to these agents, California state officials say in the Archives of Environmental Health, 1:18, 1960, published by the American Medical Association.

Goldy D. Kleinman, Dr. Irma West and Marguerite S. Augustine, all of California's State Department of Public Health, say there were 749 reports of disease attributed to the chemicals in 1957. Nearly a third of these were attributed to organic phosphate pesticides.

These "are among the most hazardous materials used as pesticides," the officials say. "Organic phosphate chemicals may enter the body directly through the skin, as well as by inhalation and swallowing.

"Since many persons find the concept of poisoning through the skin hard to understand, workers often fail to wear protective clothing when applying such chemicals and to wash themselves thoroughly afterward."

Other pesticides contain nicotine, fluorides and arsenic compounds, any of which can be hazardous. California is estimated to use one-fifth of the total quantity of pesticides in the United States. One death attributed to agricultural poisoning was recorded in 1957.

• Science News Letter, 78:121 August 20, 1960

PUBLIC HEALTH

Russia Plans to Wipe Out Malaria There in 1960

➤ SOVIET HEALTH OFFICIALS seek to completely eradicate malaria in Russia this year and to reduce diphtheria, rabies, hookworm disease and Taeniarhynchus (a beef tapeworm) infestation to the point of sporadic occurrence by 1965, according to a translation by the Central Intelligence Agency. The report is distributed by the U.S. Department of Commerce, Office of Technical Services.

At the present time, malaria as well as tularemia have almost been wiped out, according to L. A. Sakvarelidze, deputy chief of the State Sanitation Inspection of the Ministry of Health in the USSR, whose report appeared originally in Meditsinskaya Sestra. Cholera, plague, black smallpox and parasitogenic typhus infections have been completely eradicated, he reports.

In January, a conference called by the Ministry of Health and other medical groups evaluated health services at regional and local levels and found them to be considerably improved, but the medical men are still concerned over communicable diseases and the use of vaccines to curb them.

To ease the burden on doctors, the Ministry plans to train subprofessional personnel, such as midwives, in immunization and epidemiology.

By 1965, health agencies should have made a sizable reduction in the incidence of polio, typhoid fever, whooping cough, tetanus, brucellosis and other infections.

• Science News Letter, 78:121 August 20, 1960

TECHNOLOGY

Tiny Drum Could Carry Information in Satellites

➤ ENGINEERS can put 100,000 bits of information on a stainless steel memory drum only three inches long and three inches in diameter. It weighs only six ounces.

Its lightness and smallness make it excellent for use in airborne or satellite computers, the developers at International Business Machines Corporation's federal systems division laboratory in Owego, N. Y., reported.

The drum, a thin steel shell, spins at 6,000 revolutions a minute within a lightweight frame. Magnetic pickup and recording heads are imbedded on the frame. These record or play back information while riding on a cushion of air 100-millionths of an inch away from the drum.

The drum and its assembly weigh eight pounds. Conventional drum assemblies weigh about 235 pounds.

• Science News Letter, 78:121 August 20, 1960

MEDICINE

Cholesterol Symptom Reduced by Exercise

➤ AFTER A FATTY MEAL, the blood plasma may show delayed clearing of cloudiness, which is thought by some researchers to indicate a high cholesterol level that may cause coronary heart disease. But tests have shown that healthy persons can speed the clearing of their blood by a little exercise.

The tests were made on 22 healthy medical students. "In a statistically significant number of cases," when they walked or cycled after a standard meal containing 60 to 75 grams of fat, the plasma cloudiness was less than when they rested.

The investigators, Harold Cohen, senior registrar at Royal Hospital, in Sheffield, and Cissie Goldberg, a statistician, report their work in the British Medical Journal, Aug. 13, 1960.

For breakfast the students, after an overnight fast, were given a standard meal such as cornflakes, medium fat fried bacon, butter, a fried egg, two ounces of cream and three ounces of milk. No restriction was placed on the amount of bread, coffee or tea or marmalade that could be taken.

The researchers tentatively concluded that exercise might well be beneficial to persons inclined to atherosclerosis.

• Science News Letter, 78:121 August 20, 1960

PUBLIC HEALTH

No Paralytic Polio In Denmark in 1960

➤ DENMARK has had no cases of paralytic polio so far in 1960. Yet no one knows how long the polio virus vaccine protection will last, Dr. Herdis von Magnus of the Entero-virus Division of Statens Serum-institut, who was responsible for all the polio vaccine made and used in Denmark, said.

About 2,500,000 persons of the 4,500,000 population of Denmark have been vaccinated with a Salk-type inactivated, or killed, polio vaccine.

Dr. von Magnus said there are a number of difficulties in predicting the duration of the immunity from the vaccine:

1. The polio vaccines have differed greatly in antigenicity from batch to batch and from year to year.

2. The immunization schedules used have varied from time to time and from one country to another.

3. The antibody response and the duration of immunity vary considerably in different persons, even when the same vaccine is used.

4. The bulk of data on the decline in immunity level comes from studies in school children whose immune response differs from that of adults.

For these reasons, she said, many more studies must be made before the duration of immunity from polio vaccine can be predicted.

She added that little is actually known about the duration of immunity in humans after the use of any virus vaccine, live or inactivated. Live virus vaccines like smallpox and yellow fever vaccine have been seen as ideal vaccines producing life-long protection. Yet, even now, exact knowledge of these vaccines is lacking.

Dr. von Magnus said the vaccination program in Denmark began in 1955. Today 90% of the population under the age of 40 has been vaccinated against polio. Most persons have been vaccinated three times, free of charge.

Last year, in 1959, a fourth vaccination was offered free to those of the population under 18 years of age. Eighty percent of those under 18 got this fourth vaccination.

• Science News Letter, 78:121 August 20, 1960

DENTISTRY

Six-Ounce Unit Checks Heart During Dentistry

➤ A HEART MONITOR attached to the arms of dental patients under anesthesia will warn dentists of cardiac changes.

The small instrument was invented for use in hospital operating rooms by Dr. William F. Veling, a Detroit surgeon. It is suggested for dental use by the medical equipment department of Chemetron Corporation's National Cylinder Gas Division.

The six-ounce monitor translates heart activity into audible "beeps." A change in the beeps coming from the instrument would warn dentists and their assistants of heart disturbances, including cardiac arrests.

• Science News Letter, 78:121 August 20, 1960

MEDICINE

Burn Victims Saved

Military plan details burn treatment resulting from years of study and research. Patch grafts are now used to conserve skin but better methods of grafting are sought.

By FAYE MARLEY

➤ QUICK ACTION and new treatment procedures are now saving hundreds of severely burned patients. The military now has the treatment down to a Standard Operating Procedure. Here is how the SOP worked for the 23-year-old wife of an Air Force enlisted man in North Carolina:

Mrs. C. was building up the fire in a wood heating stove in her home when her clothes caught fire. Before the flames were put out, more than 50% of her body surface had been burned so deeply that the skin had been completely destroyed. She was taken at once to Womack Army Hospital at Fort Bragg. Army surgeons there treated her for shock.

She was given morphine. (Pain, however, is often negligible in severe burn cases because the skin nerve ends have been destroyed.)

Large amounts of blood and electrolyte (salt) solution were given through a polyethylene tube inserted into one of her veins. The tube was kept there for several days to avoid repeated insertions for transfusions.

Because of the obvious severity of the burns and the area covered, the Womack surgeons immediately telephoned the Brooke Army Medical Center's surgical research unit at Fort Sam Houston, Texas, to request a plane with a burn team to take the patient there.

MATS Sends Plane

Within hours, the team, composed of a doctor, a nurse and a trained Army specialist, was sent by the Military Air Transport Service of the Air Force. Within 30 hours after her accident, Mrs. C. was at Brooke Army Medical Center. A helicopter had brought her from Brooks Air Force Base in San Antonio to the Center.

The Brooke surgeons saw that the patient had safely survived the burn shock phase. Because severe burns on her face and neck had impaired her breathing, the surgeons cut open her windpipe.

On the fourth day the patient's condition was sufficiently stable to allow the surgeons to cut away the burned tissue from her hands and lower right leg under general anesthesia. Two days later skin grafts were applied from unburned areas of Mrs. C's own body to the destroyed areas.

In cases of this kind, the amount of skin available for grafting can be extended by cutting it into checkerboard squares. For example, a patch of skin 16 square inches is cut up into one-inch squares and grafted onto an area of the body, leaving a half inch between the patches. The epithelium (covering of the skin) grows from the edges, and although scars will be left by the checkerboard method, it has the advantage of covering a larger area when the supply of skin is limited.

Mrs. C's grafts took well. She was able to use her hands ten days after the operation. The remainder of the full thickness burns of the body surface began to separate from the underlying living tissue in the third and fourth week.

A modified exposure method is used in the treatment of most of the patient's burns except for the hands. This method consists of placing one layer of coarse mesh gauze rather than thick heavy dressing over the grafted burn wounds.

The layer of gauze protects the skin grafts until they become firmly attached, permits the burn wound to remain dry and discourages the growth and multiplication of bacteria.

On the 26th day Mrs. C's face, ears and abdominal wall were grafted, and on the 39th day following the accident, grafting could be completed on her legs. The fifth and final skin grafting was then done. Mrs. C. is now completely healed and can move about.

The treatment of this patient has resulted from years of study and research. The Army Standard Operating Procedure is now generally accepted in the United States. Further research continues at Brooke Army Medical Center, one of the 11 units under the U. S. Surgeon General's Medical Research and Development Command in Washington.

Lt. Col. Harold F. Hamit, chief, surgical research branch of the Command, said in an interview, "in addition to what we do in Army laboratories and hospitals, we spend some $360,000 a year on burn research contracts with various universities and medical schools.

"Two of the physicians involved in the recent kidney transplant at Peter Bent Brigham Hospital in Boston, in which a non-identical twin was able to tolerate his brother's healthy kidney, are working under contracts with the Command.

Interested in Homografts

"Frankly, our interest in this case is primarily in its relationship to skin homografts," Col. Hamit said.

(There are three types of grafting: autografts, the use of the patient's own skin; homografts, in which the skin of another person is used on that of the burn victim; and heterografts, in which animal tissue is used.)

"At present, burn victims, other than identical twins, will not tolerate skin grafts from other persons very long. We are interested in whatever can be discovered about

MODIFIED EXPOSURE—Exposure treatment helps prevent infection in burned boy shown here after skin grafts are covered with light gauze to permit air to reach injured surface.

such things as protein differences between individuals who reject tissue grafts."

Col. Hamit said one of the most promising studies is that of ribonucleic acids (RNA) and deoxyribonucleic acids (DNA) in the white blood cells and other kinds of cells. He said these acids appear to form some of the basic "building blocks" of the proteins in the chromosomes, nuclei and other parts of the cell.

"Slight differences in combination of the basic elements of these proteins appear to be responsible for some of the differences in individuals, and we are trying to learn what these differences are," he explained.

Obtaining enough of the patient's own skin to cover the burn area is a problem in cases of large-sized burns. Skin from other people is often used as a temporary covering until the victim's own skin can grow.

The Russians have used the membrane lining the abdominal wall of cattle for a temporary graft or "dressing" to the burned skin of human beings. There are cases in the United States in which the skin from unborn calves has been used as a temporary graft on people. Skin from persons who have just died is commonly used for temporary grafts, provided permission has been granted prior to death.

• Science News Letter, 78:122 August 20, 1960

PUBLIC HEALTH

May Reduce Strontium-90

▶ AN IMPORTANT ADVANCE has been reported toward ultimate control of strontium-90, an element in radioactive fallout and one of the recognized hazards of the atomic age.

Dr. Willard F. Libby, a former Atomic Energy Commissioner, has suggested that the biological availability of strontium-90 might be reduced if nuclear explosions were conducted so that the strontium-90 is incorporated in insoluble particles that would make it unavailable to living organisms. Such incorporation would have to take place in the bomb cloud during the time required for condensation of the explosive material.

Dr. Libby's theory was tested in a series of experiments by Drs. E. A. Bryant, G. A. Cowan, J. E. Sattizahn and B. Warren of the University of California's Los Alamos Scientific Laboratory at Los Alamos, N. M.; Drs. W. R. Heald and R. G. Menzel of the U. S. Department of Agriculture soil and water conservation research division, Beltsville, Md.; and Dr. R. F. Reitemeier of the AEC's division of biology and medicine in Washington, who report their results in Science, 132:327, 1960.

Certain requirements must be met to successfully reduce the biological availability of strontium-90 (its uptake in plants from contaminated soil):

1. Incorporation in particles able to resist prolonged exposure to weathering and soil.

2. Incorporation in sufficiently large particles so that the strontium-90 does not diffuse appreciably in the 28 years of its half-life.

3. The right temperature history to allow incorporation of strontium-90 formed by decay of non-condensable krypton-90, a gaseous predecessor of strontium-90 with a 33-second half-life.

The extent to which the requirements are met determines the availability of the strontium-90. Tests showed that availability could be reduced by 50%. However, complete failure of any one requirement apparently results in complete failure to reduce availability.

The extent of world-wide fallout reduction also may depend on whether the explosion is at ground-level or in the air. Ground-level will offer the possible advantage of increased local fallout as opposed to world-wide fallout.

• Science News Letter, 78:123 August 20, 1960

ROCKETS AND MISSILES

"Sky-Writing" Satellites Forecast by Russians

▶ "SKY-WRITING" by satellites as far from the earth as the moon or farther, using small batches of the element lithium, is forecast by five Russian scientists.

They suggest a method for substantially increasing the brightness of space rockets by ejecting a cloud of gas that will glow like an artificial comet. The development of a lithium artificial comet will solve the problem of optical observations of man-made satellites within the solar system, they predict.

A cloud of vaporized sodium has already been used by the Russians to aid in tracking the lunar rocket launched on Sept. 12, 1959. Since sodium is not an "ideal substance" for making artificial comets, they recommend lithium. One reason is that 40 times as much sodium is needed as when lithium is used.

The suggestion for using artificial lithium comets is reported in Soviet Astronomy, 3:986, 1960, published in New York by the American Institute of Physics, in a translation of a paper by I. S. Shklovskii, V. F. Esipov, V. G. Kurt, V. I. Moroz and P. V. Shcheglov of the P. K. Shternberg State Astronomical Institute.

• Science News Letter, 78:123 August 20, 1960

PUBLIC SAFETY

Home Fires Have Decreased in Past Year

▶ THE NATIONAL BOARD of Fire Underwriters has reported that the home inspection program of the International Association of Fire Chiefs has decreased fires by five percent throughout the nation in the past year. In 1959, 15,000,000 homes in the United States were inspected by uniformed firemen.

• Science News Letter, 78:123 August 20, 1960

OPTICAL BARGAINS

Order by Stock No.—Send Check or M.O.—Satisfaction or Money Back!

OFFSPRING OF SCIENCE . . . REALLY BEAUTIFUL! CIRCULAR DIFFRACTION—GRATING JEWELRY

Shimmering rainbows of gemlike color in jewelry of exquisite beauty—made with CIRCULAR DIFFRACTION—GRATING REPLICA. Just as a prism breaks up light into its full range of individual colors, so does the diffraction grating. Promises to become a rage in current fashion.

Stock #30,349-Q Earrings ..... $2.75 Pstpd.
Stock #30,350-Q Cuff Links ..... $2.75 Pstpd.
Stock #30,372-Q Pendant ..... $2.75 Pstpd.
Stock #30,373-Q 2 Pins ..... $2.75 Pstpd.
Stock #30,390-Q Tie-Clasp ..... $2.75 Pstpd.

GIANT OPTICAL BARGAIN KIT

Useful popular items all in one package. You get: PRISM; DIFFRACTION GRATING; POLARIZING FILTERS; 5 LENSES DOUBLE-CONVEX, 14 x 48mm; "FUN WITH OPTICS," 32-page instruction book; "BEGINNER'S LENS KIT," 10 lenses to make many optical items; "STAR & SATELLITE PATHFINDER" Instruction Book; RECTANGULAR MAGNIFIER. A big $10 value.
Stock No. 50,204-Q ..... $3.00 Pstpd.

AGES-OLD FOSSIL COLLECTIONS

Millions of years old! 3 full sets—30 fantastic plant and animal fossils—all for $3.75. EARTH SCIENTIST SET: Dinosaur bone, crinoid stem, horn coral, worm tubes, petrified wood, bryozoa stem, lamp shell, scallop, sea urchin, oyster, clam, snail fossil. CARBONIFEROUS SET: Brachipod, worm burl, crinoid stem, fusuline, horn coral, bryozoan, snail and clam. CRETACEOUS SET: Brachipod, oyster, sea urchin, petrified wood, etc. All three sets for one low price!
Stock No. 50,344-Q ..... $3.75 Postpaid

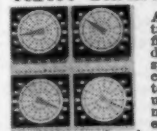
Here's a Terrific Buy!
WAR SURPLUS! American-Made!
7 x 50 BINOCULARS

Big savings! Brand new! Crystal clear viewing—7 power. Every optical element is coated. An excellent night glass—the size recommended for satellite viewing. Individual eye focus. Exit pupil 7 mm. Approx. field at 1,000 yds. is 376 ft. Carrying case included. American 7 x 50's normally cost $195. Our war surplus price saves you real money.
Stock No. 1533-Q ..... only $55.00 pstpd. (tax incl.)

Bargain-Priced STETHOSCOPE
FOR HOBBYISTS, SCHOOLS

Listen to running machinery. Check on hard-to-hear motor noises, leakage of gas, air, or fluid. Pick up heart beats of animals, insect noises, other "unhearable" sounds. Splendid for experiments, classroom use.
Stock No. 50,223-Q ..... $2.95 Pstpd.
Stock No. 50,270-Q—Deluxe Model .. $5.95 Pstpd.

NEW! BRAINIAC COMPUTER SET



A fascinating and interesting introduction to the important new field of the computer. Makes such devices as: interplanetary time and space calculator, reasoning machine, logic games, intelligence tester, many other experimental units. All connections are with nuts and bolts—no soldering necessary. Designs can be changed in minutes. Complete with 23-page Booklet—plus 9 electrical research experiments. Overall size: 15" x 20".
Stock No. 70,305-Q ..... $11.95 postpaid

Take Telephoto Shots Thru
7 x 50 MONOCULAR

This is fine quality, American made instrument—war surplus! Actually ⅛ of U.S. Govt. 7 x 50 Binocular. Used for general observation both day and night and to take fascinating telephoto shots with your camera. Brand new, $95 value. Due to Japanese competition we close these out at bargain price. Directions and mounting hints included.
Stock No. 50,003-Q ..... $15.00 Pstpd.

FREE CATALOG-Q
128 Pages! Over 1000 Bargains!

America's No. 1 source of supply for science experimenters, hobbyists. Complete line of Astronomical Telescope parts and assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories. Telescopes, microscopes, satellite scopes, binoculars, infrared snipescopes, items for making "Science Fair" projects, math learning and teaching aids. Request Catalog Q.

EASY PAYMENT PLAN AVAILABLE! DETAILS WITH CATALOG!

EDMUND SCIENTIFIC CO.
BARRINGTON, NEW JERSEY

Books of the Week

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C.

ANIMAL GROWTH AND DEVELOPMENT—Maurice Sussman—*Prentice-Hall*, 114 p., illus., $2.95; paper, $1.50. Compact text, part of the new series "Foundations of Modern Biology," written by research scientists for students on undergraduate level.

THE ATOMIC SUBMARINE: A Practice Combat Patrol Under the Sea—Russell Hoban—*Harper*, 32 p., illus. by author, $2.50. A book for boys.

BEHAVIOR GENETICS—John L. Fuller and W. Robert Thompson—*Wiley*, 396 p., illus., $8.95. Surveys the methods used in studying the influence of heredity on behavior and offers comprehensive review of modern research covering both animal and human studies. Extensive bibliography included.

BOATING IN AMERICA—Wm. Taylor McKeown, Ed.—*Ziff-Davis*, 303 p., illus., $6.95. Guide to boating on the North American continent, from Nova Scotia to the Bahamas; from Padre Island, Texas, to central Canada; from the west coast of Mexico to Alaska.

THE CELL—Carl P. Swanson—*Prentice-Hall*, 114 p., illus., $2.95; paper, $1.50. First in a new series of short, compact volumes designed to teach biology by closing the gap between current research and college teaching, with stress on scientific principles rather than details of classification.

A CENTURY OF OIL AND GAS IN BOOKS: A Descriptive Bibliography—E. B. Swanson—*Appleton*, 214 p., $4.75. Sponsored by the American Petroleum Institute; includes all items published commercially or privately in English; a guide for researchers and librarians.

CHEMISTRY IN THE SERVICE OF MAN—Alexander Findlay—*Harper*, 8th ed., 318 p., illus., paper, $1.75. Some of older material has been cut to include more recent work on metals, drugs, insecticides, artificial fibers, hormones, plant growth regulators and nuclear energy.

CLOCKS TELL THE TIME—Alma Kehoe Reck—*Scribner*, 48 p., illus. by Janina Domanska, $2.75. Beautifully designed children's book about clocks through the ages, from shadow clocks to atomic clocks.

A DICTIONARY OF ENGLISH SYNONYMS AND SYNONYMOUS EXPRESSIONS—Richard Soule, Alfred Dwight Sheffield, Ed., foreword by Edward Weeks—*Bantam Bks*, 528 p., paper, 95¢. Unabridged reprint of latest edition of standard work designed as a guide to apt and varied diction; contains more than 20,000 word entries.

ECOLOGY AND DISTRIBUTION OF RECENT FORAMINIFERA—Fred B. Phleger—*Johns Hopkins Press*, 297 p., illus., $7.50. Summarizes principal work done on the ecology of modern Foraminifera and attempts to present results in a system useful to oceanographers and geologists.

ELECTROPHYSIOLOGY OF THE HEART—Brian F. Hoffman and Paul F. Cranefield, foreword by Franklin D. Johnston—*McGraw*, 323 p., illus., $12.50. Comprehensive presentation of technique of microelectrode recording and discussion of records obtained by this method.

EXPERIMENTAL BIOCHEMISTRY: A Laboratory Manual—Gerald Litwack—*Wiley*, 313 p., illus. paper, $5.50. To serve as an outline of experiments for an introductory course in the biochemical laboratory at the undergraduate or beginning graduate level.

FAMILIAR INSECTS OF AMERICA—Will Barker, foreword by Hilary J. Deason—*Harper*, 236 p., illus. by Carl Burger, $4.95. Introduction to the study of insects; helps understanding of their evolution, the curious ways in which they live and reproduce, and their influence on other living creatures, humans included.

FLAMES: Their Structure, Radiation and Temperature—A. G. Gaydon and H. G. Wolfhard—*Chapman (Macmillan)*, 2nd rev. ed., 383 p., illus., $12. Advanced discussion of stationary flames, with emphasis on the physical rather than the chemical viewpoint.

THE GOLDEN BOUGH: A Study in Magic and Religion—Sir James George Frazer—*Macmillan*, 864 p., paper, $2.50. Reprint of Frazer's abridged edition of his book on the remarkable rule that regulated the succession to the priesthood of Diana at Aricia.

GUIDE TO FITTING OUT—Jim Emmett—*Ziff-Davis*, 246 p., illus., $6.95. Large-size handbook of advice with 240 different plans for the improvement of small boats.

HEALTH STATISTICS: Peptic Ulcers Reported in Interviews, United States, July 1957-June 1959—U. S. National Health Survey—*GPO*, 26 p., paper, 25¢. Statistics on prevalence of peptic ulcers by age, sex and medical care status.

THE HIGHER ARITHMETIC: An Introduction to the Theory of Numbers—H. Davenport—*Harper*, 172 p., paper, $1.35. First published in 1952, treats factorization and the primes, congruences, quadratic residues and forms, continued fractions and sums of squares.

HYSTERIA, REFLEX AND INSTINCT—Ernst Kretschmer, transl. from German by Vlasta and Wade Baskin—*Philosophical Lib.*, 162 p., $4.75. Theory of hysteria built on the foundation laid by Charcot's studies of suggestion and hypnosis and Freud's discovery of the interrelations between psychic and somatic disturbances.

LABORATORY MANUAL FOR GENERAL ZOOLOGY—Jewett Dunham and Robert E. Haupt—*Burgess*, 191 p., illus., paper, $4.25.

LET'S COLLECT ROCKS—*Shell Oil Co.*, 17 p., illus., paper, single copies free upon request direct to publisher, 50 W. 50th St., New York 20, N. Y. Answers beginners' questions about rocks, minerals, fossils and how to start a collection.

NEW HOPE FOR STROKE VICTIMS—Robert A. Kuhn—*Appleton*, 206 p., illus., $4. Neurosurgeon describes for the layman modern tests by which strokes are investigated, the different causes of strokes, their treatment, case histories and answers to questions.

ORIGINS OF ALCOHOLISM—William McCord and Joan McCord with Jon Gudeman—*Stanford Univ. Press*, 193 p., $4.75. Longitudinal social study of 29 boys who later became alcoholics. By comparing childhood data of alcoholics and those who were not alcoholics, the authors distinguish a pattern of experiences and traits that set the alcoholics apart and suggest the causes of their disorder.

THE OTHER CHILD: The Brain-Injured Child—Richard S. Lewis, Alfred A. Strauss and Laura E. Lehtinen—*Grune & Stratton*, 2nd rev. ed., 148 p., $3.75. Written for parents and laymen; discusses perception, language, behavior, management and education of the brain-injured child.

PARAPSYCHOLOGY—Rene Sudre, transl. from French by C. E. Green—*Citadel Press*, 412 p., $6. A French writer gives his interpretation of this controversial subject.

PESTICIDE HANDBOOK 1960—Donald E. H. Frear—*College Science Publishers*, 12th ed., 265 p., $3.25; paper, $1.75. Lists names, active ingredients and manufacturers of more than 7,000 insecticides, fungicides, herbicides, rodenticides and other agricultural chemicals.

PETROLEUM SOURCEBOOK 1959: A Regional Bibliography of Petroleum Information—Curtis Stevens, Ed.—*Nat. Petroleum Bibliography*, 234

Get UNITRON's FREE

Observer's Guide and Catalog on

ASTRONOMICAL TELESCOPES

This valuable 38-page book is yours for the asking!

With artificial satellites already launched and space travel almost a reality, astronomy has become today's fastest growing hobby. Exploring the skies with a telescope is a relaxing diversion for father and son alike. UNITRON's handbook contains full-page illustrated articles on astronomy, observing, telescopes and accessories. It is of interest to both beginners and advanced amateurs.

Contents include—

- Observing the sun, moon, planets and wonders of the sky
- Constellation map
- Hints for observers
- Glossary of telescope terms
- How to choose a telescope
- Amateur clubs and research programs

UNITRON

INSTRUMENT DIVISION of UNITED SCIENTIFIC CO.
204-206 MILK STREET • BOSTON 9, MASS.

Please rush to me, free of charge, UNITRON'S new Observer's Guide & Telescope Catalog 5-F-S.

Name.....

Street.....

City.....State.....

Save money on this: B & L

DOUBLE LENS MAGNIFIER

#81-24-75, with moderately high magnification and flat field. Extensively used by tool and die makers, engravers and artists. Bacteria counting, biological and insect work are other uses. Makes a fine condensing lens. Semi-achromatic, made of two plano-convex lenses. 1⅝" clear lens diameter, 3.5 power. Regular $4.25. Limited stock @.... **$3.50** p. p.

HARRY ROSS *Scientific & Lab Apparatus* 68 Reade St., N. Y. 7, N. Y.

YOUR HAIR AND ITS CARE

By O. Levin, M.D., and H. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as: Dandruff — gray hair — thinning hair — care of the scalp — baldness — abnormal types of hair — excessive oiliness — brittle dryness — hair falling out — infection — parasites — hair hygiene, etc., etc.

"A worthwhile book full of important information." —Ohio State Medical Journal.

Price $2.95, incl. ptg. 5-Day Money-Back Guarantee

EMERSON BOOKS, Inc., Dept. 51-M
251 W. 19th Street, New York 11

IDENTIFY ANY TREE!

Two-volume set by foremost dendrologist, W. H. Harlow. "Trees," full text, 950 photos, covers 140 common trees of N. and N.E. USA. "Twig & Fruit Guide," enables you to identify trees & shrubs in winter, any season. Identification, folklore, uses, etc. Total 444pp. $2.60 plus 10¢ postage. Money-back guarantee. Dept. SNL. DOVER, 180 Varick St., N. Y. 14, N. Y.

p., paper, $7.50. World-wide directory of information sources classified by country, region and state.

PHYSICS: Foundations and Frontiers—George Gamow and John M. Cleveland—*Prentice-Hall*, 551 p., illus., $7.95. Introduction to modern physics at the college level, based on Gamow's "Matter, Earth and Sky." Calculus has not been used; trigonometry included has been treated in the text itself.

PROBLEMS OF LIFE: An Evaluation of Modern Biological and Scientific Thought—Ludwig von Bertanffy—*Harper*, 216 p., paper, $1.35. First published in 1954, gives survey of basic biological problems and laws within the framework of "organismic conception."

RUDOLPH MATAS: A Biography of One of the Great Pioneers in Surgery—Isidore Cohn with Hermann B. Deutsch—*Doubleday*, 431 p., photographs, $5.95. The New Orleans surgeon's life as seen through the eyes of an admiring student, associate and friend of many years.

SCIENTIFIC MANPOWER 1959: Papers of the Eighth Conference on Scientific Manpower—National Science Foundation—*GPO*, 38 p., paper, 30¢. Conference theme was "Higher Education and Training in Emerging Fields of Science and Technology."

SELECTIVE TOXICITY—Adrien Albert—*Wiley*, 2nd rev. ed., 233 p., illus., $5.50. About toxic agents that injure some kinds of cells and not others, even when the two kinds are growing close together. Book is concerned with drugs, weed killers and insecticides.

STATISTICAL HANDBOOK OF SCIENCE EDUCATION—National Science Foundation—*GPO*, 94 p., paper, 55¢. Compilation of pertinent statistical material on the education and training of scientists and engineers in the United States.

THE TRUE BOOK OF PLANT EXPERIMENTS—Illa Podendorf—*Childrens Press*, 48 p., illus. by Bill Armstrong, $2. For the beginning reader, simple experiments he can do at home or at school.

USSR: Its People, Its Society, Its Culture—Thomas Fitzsimmons, Peter Malof and John C. Fiske—*HRAF Press*, 590 p., $8.50. An analysis that seeks to define the dominant sociological, political and economic aspects of the USSR as a functioning society, to present that society's strength and weaknesses, and to identify the patterns of behavior characteristic of its members.

• Science News Letter, 78:124 August 20, 1960

ELECTRONICS

Nuclear-powered "Sentry" to Be Built

➤ A NUCLEAR-POWERED automatic electronic "sentry" capable of recording data and transmitting it from a remote ground location for at least two years without servicing or refueling is being developed for the U. S. Atomic Energy Commission.

Energy for the "sentry" will be supplied by a five-watt generator, which will convert heat from safely-enclosed pellets containing strontium-90 directly into a continuous flow of electricity.

The device will be linked with weather instruments to measure temperature, wind speed, wind direction and barometric pressure in order to demonstrate its capabilities. It could, however, be easily modified to detect seismic disturbances or to record continuously any other type of information in a remote area.

• Science News Letter, 78:125 August 20, 1960

ROCKETS AND MISSILES

Probe for Life on Mars

➤ THE FIRST ROCKET PROBE to Mars should contain equipment capable of detecting interference by intelligent Mars beings, two California scientists said.

The probe should also carry instruments to transmit back to earth information on the nature of the Martian canals and on Phobos and Diemos, the two Martian moons, Wells A. Webb, a research chemist for Hexcel Products, Inc., at Berkeley, and Dr. James A. Harder, assistant professor of civil engineering at the University of California, Berkeley, told the third annual West Coast meeting of the American Astronautical Society at Seattle, Wash.

They believe there is enough evidence indicating the possibility of past or present intelligent life on Mars to make it worthwhile to instrument the first Mars probe to detect manifestations of such intelligence. Most astronomers believe that not man or man-like creatures, but mosses and lichens, are the highest form of life on Mars.

The chemist and civil engineer, who suggest the possibility of a high form of life on Mars, said that the best way to make allowances for the interception or destruction of a Mars probe would be to install a proximity detector in the probe. This would preferably be one which detects the velocity of approach of nearby objects by means of a shift in the frequency of a signal given off by the probe.

Why expect interference from Mars beings?

If men were advanced only 20 years beyond our present capabilities, the scientists said, no artificial probe approaching the earth would escape detection, destruction or, possibly, capture. Intelligent beings on Mars, assuming there are any, might already have this capability.

The two researchers stressed the importance of discovering whether the canals and satellites of Mars are artificial and the need to get telescopes above the earth's atmosphere to do this. The question of the canals, they stated, could be resolved with a stabilized earth satellite carrying a powerful telescope and a delicate aligning system along with a relatively simple radio transmission system.

But the problem of the Martian moons can be resolved only with a Mars probe containing a small telescope-viewing camera and a complex television transmitter. Transmission of television pictures from the area of Mars, about 50,000,000 miles away, is no simple task.

• Science News Letter, 78:125 August 20, 1960

ANNOUNCING!—A NEW MAGAZINE!

RECREATIONAL MATHEMATICS MAGAZINE

Devoted to discussions of lighter mathematical topics, brainteasers, paper-folding, numerical curiosa, games, etc. A bimonthly publication to start FEBRUARY 1961. Price 65¢ per issue or $3.50 a year subscription rates ($3.00 a year for teachers, students, and libraries).

Every subscriber you turn in earns you a free issue, every five earns you a free year's subscription. Include your name with the new subscribers'.

Subscribe now and be billed upon receipt of the first issue.

RECREATIONAL MATHEMATICS MAGAZINE
BOX 1876
IDAHO FALLS, IDAHO

By all means, send me RMM starting with first issue, FEBRUARY 1961. I want to subscribe now for .....year(s) and want to be billed upon receipt of the first issue.

☐ I am a teacher. ☐ I am a student.

NAME (Please Print).....

ADDRESS.....

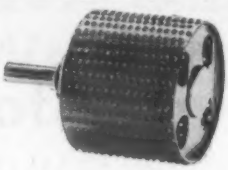
CITY..... ZONE..... STATE.....

Amazing Tool for Electric Drills!

THE ORIGINAL ROTARY

KUT-ALL

Multi-Purpose Cutting Tool for Wood, Plastic, Metal, etc.



SAVES HOURS of Work and EASES JOB of: Shaping Contours and Edges—Rasping, Planning, Smooth-Finishing Surfaces—Beveling—Cutting Cross Grain Plywood—Removing Paint—Deburring Metals and Castings.

Diameter: 1¾". Cutting Face Length: 1½". ¼" Shank fits chuck of your portable Electric Drill, Drill Press, or Lathe.

MADE IN AMERICA and Precision Engineered of ALL HARDENED STEEL—NO PLASTIC PARTS.

Order No. 762

• SMOOTH OPERATING • SELF-CLEANING
• CUTS FAST • REQUIRES NO SHARPENING

ONLY **$2.45** Postpaid

John Surrey, Ltd., 11 West 32nd St., Dept. SN-83, New York 1, N. Y.

12 LEPIDOPTERA $1.00 pp.

(Butterflies to you)

Imported exotic jungle beauties, dried flat, ready to study, re-mount or make into many beautiful decorative items. Gorgeously colored, exquisitely shaped by nature. Fabulously more colorful than man's best efforts. Educational, fascinating for every age. Send $1.00 at once for 12 different butterflies.

HARRY ROSS Scientific & Lab Apparatus 61-L Reade St., N.Y. 7, N.Y.

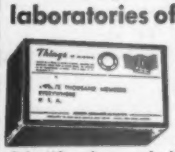
Best Book Contest For 1960

$1600 Cash Awards plus 40% return. All types of manuscripts invited. For Contest rules and details of famous publishing plan, write for free Brochure SN.

Pageant Press, 101 Fifth Ave., N. Y. 3

Things **of Science**

--monthly "magic" from the laboratories of man & nature!



For only $5.00 per year we will send you 12 monthly surprise packages of new and unusual items of scientific interest. Included will be clear instructions for use along with absorbing authoritative background information.

Scientific fun, valuable knowledge, mental stimulation, hours of absorbing relaxation! Send your application, with $5.00, to

Things **of Science**

1719 N ST., N.W., WASHINGTON 6, D. C.

LINGUAPHONE

MAKES IT EASY TO LISTEN and LEARN to *Speak*

SPANISH (American or European) • FRENCH
GERMAN • ITALIAN • RUSSIAN
MODERN GREEK • JAPANESE

Any of 34 languages available at home

Only **LINGUAPHONE**, The World's Standard Conversational Method, brings 8 to 12 of the world's best native language teachers into your home on fine recordings.

It's like living in another land. You listen. You hear native men and women converse about up-to-date, every-day matters. You understand. You **SPEAK** quickly, easily, naturally. You acquire a true accent no **TEXTBOOK CAN TEACH.**

Exciting Business. Travel Opportunities Here and Abroad with Linguaphone. Endorsed by schools, governments, business firms all over the world. Over a million home-study students have learned another language this ideal, conversational way.

Stop Wishing—Start Talking! Send for **FREE** Book and Details of **FREE TRIAL.** Linguaphone Institute, T-31-080 Radio City, New York 20, N. Y.

ELECTROSTATIC GENERATORS

(Van de Graaff Type)

500,000 VOLTS. This model available in kit form is over 3 feet tall and has a 15" diameter spherical charge collector. Kit includes 15" hemispheres, plastic tube, pulleys, bearings, belt, frame, and assembly directions.

$32.50 Postpaid

200,000 VOLTS. This model (shown at left) is 17" high and has a 6⅛" diameter spheroidal charge collector. Operates on 110 volt AC. Fully assembled, postpaid **$39.95.** Kit form **$24.95.** Other models to 1,000,000V.

Vacuum Equipment. Mech. pumps for pressure range 1 Atmosphere down to 150 Microns **$32.50.** Diffusion pumps for pressure down to .01 Microns **$16.00.** McLeod guages for rahge 1 Micron to 1000 Microns **$14.** Write for free spec. sheets. Dept. SN.

Morris & Lee, 294 Elm, Buffalo 3, N. Y.

AN AD OF THIS SIZE costs only $18.90 for a single insertion. Rates are considerably lower per issue for multiple insertions within one year. Circulation of SCIENCE NEWS LETTER is now over 75,000 copies per issue—and increasing steadily. Send us YOUR "copy" instructions, now, for the next issue.

A ONE-INCH DISPLAY "AD"

MICRO-ADS

Equipment, supplies and services of special interest to scientists, science teachers and students, science-minded laymen and hobbyists.

25¢ per word, payable in advance. Closing date 3 weeks prior to publication (Saturday).

SNL, 1719 N St., N.W., Washington 6, D. C.

GOVERNMENT SURPLUS RADIOS, RECEIVERS, transmitters, gadgets, parabolic reflectors, infra-red snooperscopes, aircraft, camera lenses. Amazing catalog 10¢. John Meshna, Malden 48, Mass.

NATIONAL GEOGRAPHIC MAGAZINES 1888-1960, any issue, Periodical Service, Box 465-SN., Wilmington, Delaware.

NEW LIQUID CASTING PLASTIC, CLEAR COLors. Embed real flowers, minerals, biological specimens, delicate instruments, electronic parts. Also cold setting resin and fiberglass for laminating, casting, molding, coating. Manual 25¢. Castolite Company, Dept. J-30, Woodstock, Illinois.

ROCKET-LOX, SOLID, H202, RECOVERY, Static Test Launchers, Design, Thrust, Flares, over 100 drawings. 32 Pages $1.00. Humphreys, P.O. Box 90391, Los Angeles 45, Calif.

THE STRUCTURE OF THE ATOM—23 PAGES with many diagrams. A completely new system of atomic structure comprising structural center, but no nucleus. Price 25 cents ppd. C. F. Krafft, 218 Columbia Road, Annandale, Virginia.

TRANSLATING FROM RUSSIAN, GERMAN, French. Nelles Translations, 119 W. Ontario Street, Chicago 10, Illinois.

Do You Know

Some New York State prisoners are undergoing *plastic surgery* to help them readjust to society after release.

Twelve percent of all *cancer* occurs in the mouth.

Knowledge of *body potassium* content is of importance in diagnosis of many diseases, especially those involving the nerves, muscles and kidneys.

Questions

AGRICULTURE—How do male chicks help eliminate flies? p. 120.

INVENTIONS—What Science Fair project has been granted a patent? p. 116.

MEDICINE—What treatment does the Army recommend for deep burns? p. 122.

Photographs: Cover, General Electric Co.; p. 115, F. C. Livingstone; p. 117, Kaiser Aluminum & Chemical Corp.; p. 119, U. S. Naval Ordnance Laboratory, White Oak; p 122, Armed Forces Institute of Pathology; p. 128, Hubley Mfg. Co.

ANIMAL HUSBANDRY

Quarantine Invoked To Check Ticks

➤ A QUARANTINE has been placed on two eastern Florida counties and on part of a third after cattle fever ticks were found there for the first time since 1957. State and Federal inspectors are checking all cattle and horses in the quarantined areas, and tracing the movements of animals shipped from these areas to points in Florida and other states during the past several months.

Until the current outbreak, the only tick-infested area in the United States has been a narrow buffer zone in parts of eight counties in Texas along the Rio Grande River. This zone is also under quarantine.

• Science News Letter, 78:126 August 20, 1960

AGRICULTURE

$2 Million Fertilizer Program Recommended

➤ AN INTERNATIONAL PANEL of fertilizer industry representatives has recommended that the UN's Food and Agriculture Organization undertake a $2,000,000 five-year program, financed by the industry, to promote the efficient use of fertilizers in less-developed countries and to provide governments with the advice and information necessary for developing a national fertilizer program.

The fertilizer industry program calls for an expenditure of $350,000 the first year, and $450,000 the second. The program would contribute $30,000 annually to the central operating fund of the Freedom-from-Hunger Campaign.

• Science News Letter, 78:126 August 20, 1960

Elgeet

of Rochester

is FIRST to bring you

PROFESSIONAL PERFORMANCE

in a Student-Teaching Microscope

for only $110.50

$99.45 in lots of five or more

Elgeet-OLYMPUS
Student-Teaching Model S-2

Now, many of the advanced features of famous Elgeet-Olympus Research Microscopes have been incorporated in the new Elgeet-Olympus line of Student-Teaching Microscopes, extending to educators for the first time a number of important instructional advantages.

In addition to its optical and mechanical superiority, you will note the exceptionally solid "heft" of your Elgeet-Olympus Student-Teaching Microscope . . . ruggedly engineered of "classroom-proof" materials to withstand daily use by untrained hands. Minimum maintenance is further assured by such refinements as completely enclosed rack-and-pinion movements, and a dust-proof, self-centering revolving nosepiece.

Prove to yourself with a 10-day Free Trial that Elgeet-Olympus Student-Teaching Microscopes provide the logical answer to educators who seek the best . . . on a budget.

IMMEDIATE DELIVERY • WRITE Dept. SM-14

Elgeet OPTICAL CO., INC. . . . SCIENTIFIC INSTRUMENT AND APPARATUS DIVISION
838 SMITH STREET • ROCHESTER 6, NEW YORK
"Quality is our watchword . . . Precision Engineering our constant goal"

New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1053. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

SWIMITTS of bright orange rubber make swimming easier. The webbing between the fingers provides a broader hand surface to the water. Maximum pulling power can be obtained by keeping fingers spread and swimming with normal gliding strokes. Skin divers can wear them as protection from sharp foreign objects encountered under water.

• Science News Letter, 78:128 August 20, 1960

TV COLOR WHEEL finds a new use for the family television set. The toy is activated by holding the kaleidoscope wheel in front of a television screen. The colorful patterns are created by the 30-cycle scanning lines that appear on all TV screens. The "TV Magic Kaleidoscope Wheel" comes with four disc changes for various designs.

• Science News Letter, 78:128 August 20, 1960

ORNAMENTAL SUNDIAL is an authentic reproduction of an ancient Roman timepiece in a rich bronze finish. This solar clock is ideal for a garden, pool, sundeck or patio. Man's first and only trouble-free clock, the sundial never runs down or needs rewinding.

• Science News Letter, 78:128 August 20, 1960

TOY CLOCK of high-impact plastic, shown in the photograph, combines the features of a useful household appliance and a take-apart, put-together toy. For

young boys and girls, everything but the spring can be completely taken apart and reassembled. There are 25 parts and corresponding gear-axle colors to help a child put the clock together.

• Science News Letter, 78:128 August 20, 1960

PLASTIC BAG FASTENER provides a quick, easy way to close plastic, fabric or paper bags. The clip is molded in two parts, an oval loop-shaped ring about two inches long, and a flat squarish cap. To close a bag, the tip is pulled through and folded down over the loop, the cap is then placed over the loop and pushed down until it locks.

• Science News Letter, 78:128 August 20, 1960

ADJUSTABLE BOOK ENDS, made of slender anodized aluminum, are spring loaded for tension, with non-marking white rubber tips. The book ends, "shelvies," hold books, records, folders, directories and magazines upright. They will fit any shelf height from 9½ to 14 inches.

• Science News Letter, 78:128 August 20, 1960

BELT PILL BOX is built into a belt buckle to hold nitroglycerin tablets. Designed for men with heart ailments that require these tablets, the cartridge in the buckle makes them easily available in an emergency.

• Science News Letter, 78:128 August 20, 1960

PLASTIC GREENHOUSES may soon use a new type of polyethylene film now being tested. The new film uses a non-pigment type of ultraviolet inhibitor. The transparent inhibitor permits the light and the warmth of the sun to penetrate the greenhouse and at the same time prolongs the life of the film.

• Science News Letter, 78:128 August 20, 1960

Nature Ramblings

By HORACE LOFTIN

A CARTOON appearing recently in a sportsman's magazine showed three sketches of deer: one for "how most people see them," one for "how the hunter sees them," one for "how the biologists see them." Those simple sketches tell much about animals, conservation—and people.

"Most people" see a deer, according to the sketch, as a gentle-eyed doe, accompanied by her sweet, spotted fawn, and together they form a picture of idyllic contentment. Who would dream of entering their woods to kill such happy creatures!

"The hunter" sees a deer as the head of an enormous buck, with wide and many-pronged antlers. This head is mounted on one of those shield-shaped plaques, and the whole is perched on a rather uninteresting and abstract body. This is the trophy deer, the animal worthy of the hunter's best efforts to stalk and outwit.

"The biologists" see their deer, the sketch shows, as a lean, hungry animal with worried eyes, holding a knife and fork in one hoof and an empty plate in the other. This is a creature wholly dependent on the resources of its environment for its livelihood.

Pictures of a Deer

Which of these is the "truest" picture of deer? Of course, none of them, for they are all true to a degree.

To start with the hungry deer:

Before arguments pro or con are heard concerning hunting versus protection, the capabilities of the deer herd's grazing range must be known. Will the acreage support more deer and maintain them in best health and balanced reproduction? Or is the woodland utilized to the hilt now, resulting in poor animals and unbalanced reproductive rates?

Obviously, the picture of contentment held by "most people" cannot be realized so long as an overabundance of deer reduces or destroys the food supply and cover. Obviously, "the hunter's" picture of a great trophy deer will not hold so long as either poor range or overhunting cuts into the deer population.

Before Europeans came to America with guns, axes and fire to change the face of the New World, deer herds and other wildlife were maintained in a general balance with food supply by the activities of predators—wolves, mountain lions and other predaceous beasts.

We have removed the predators. It is up to us now to balance our wildlife by utilizing a wise combination of hunting, protection and habitat management.

• Science News Letter, 78:128 August 20, 1960